

Excellence in Airport Lighting & Obstruction Technology

- World wide leader for more than 75 years
- Headquartered in Windsor, Connecticut, USA
- Most complete line of products and services
- Latest design technology available in the industry
- Hundreds of installations around the world
- ISO 9001:2000



Full range of airfield lighting and control system products



Inset and Elevated Lighting



Airfield Guidance Signs



Power Distribution Equipment



Airfield Lighting Control Systems

7:30 - 9:00 PM

- Introduction to ICAO
- Low Intensity
- Medium Intensity
- High Intensity

9:00 PM Dinner

- Aviation Obstruction Lights may be Low, Medium, or High Intensity
- All of our lights have been rigorously tested and approved by the FAA
- All products meet ICAO requirements

- ICAO – International Civil Aviation Organization
- Provides guidance for Civil Aviation around the world
- Provides common Standards and Practices
- 188 Member Countries

- FAA products must be certified by an independent lab
- FAA requires additional product testing
- There is no ICAO “certification”
- Manufacturers “self-certify” to meet the standards required by ICAO
- No product testing required

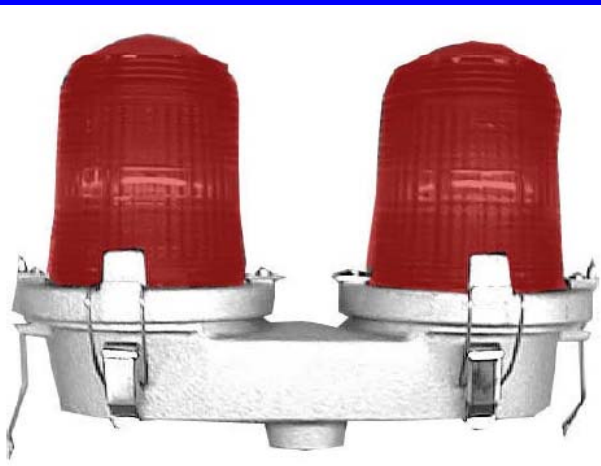
FAA product insures a rigorous and well tested product

- Lights must be tested by an independent lab
- The lab reserves the right to arrive unannounced at our factory and take random samples for testing
- Lights are tested for optical, photometric and environmental tests
- The lights must be compliant with FAA Advisory Circular No:150/5345-43E
- US Military Standards and Specifications are also used in the Certification Process

In addition to optical & photometric testing, we certify to...

1. Temperature – Lights must operate in a temperature range from -55°C to +55°C
2. Humidity – Lights must operate in an environment of 95% humidity
3. Wind – Lights must operate in wind up to 240 kph
4. Wind-blown Rain – Lights must withstand wind-blown rain from any direction
5. Salt-fog – Lights must operate in a salt-laden atmosphere

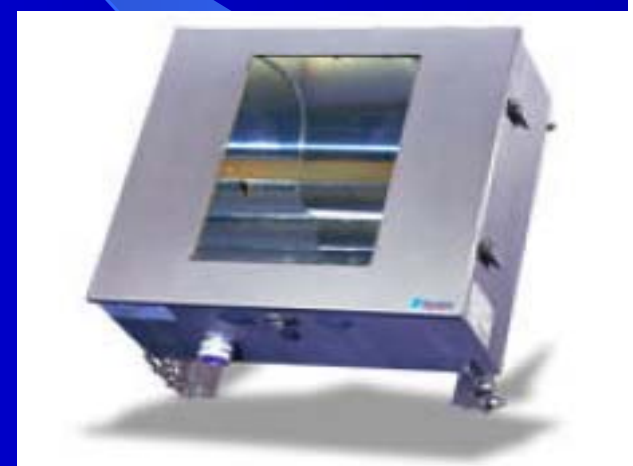
ICAO recognizes three categories of obstruction lights



Low Intensity



Medium Intensity



High Intensity

The Category of Light Depends On the Structure Height

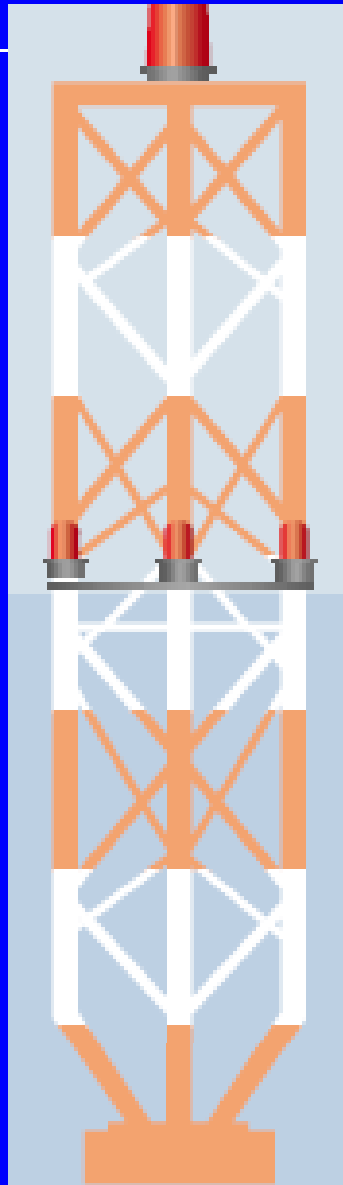
Height	0 – 45m	45 – 150m	> 150m
Category	Low	Medium	High

Each Category has Sub-categories

Category	Low Intensity	Medium Intensity	High Intensity
Sub-categories	Types A, B, C, and D	Types A, B, and C	Types A and B

ICAO recognizes two options for day/night operations

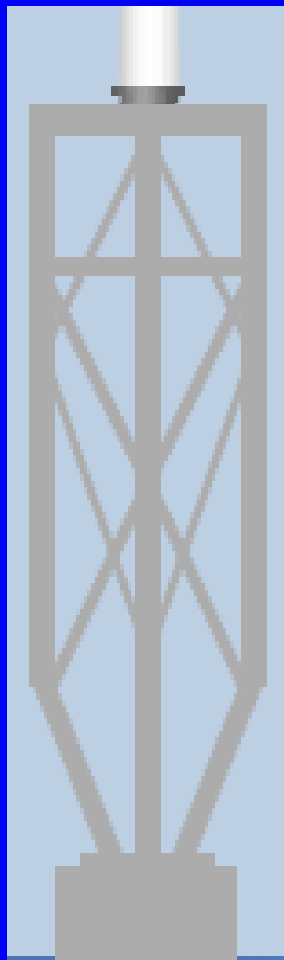
	Option One	Option Two
Day	Red and White Paint	White Strobe Lights
Night	Red Lights	White Strobe Lights



Option One: Red Light and Paint 60 meter structure

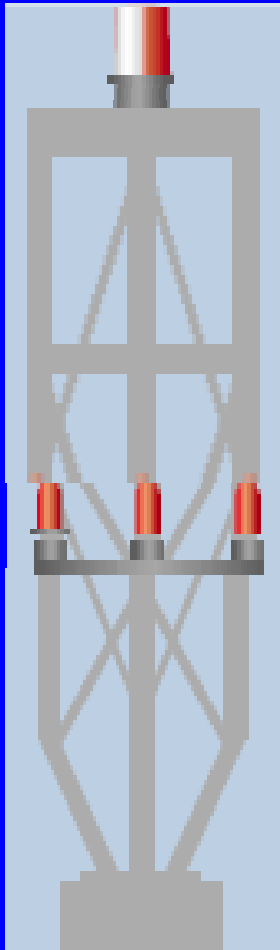
1. Paint for Day Marking
2. Red Lights for Night Marking
3. When a Red, Medium Intensity Light (ICAO Type B) is used, Low Intensity Lights (ICAO Type B) must be installed at mid-height.
4. Red Lights are only used at night.

Option Two: White Light 60 meter structure



1. White Strobe for Day Marking
2. White Strobe for Night Marking
3. When a White, Medium Intensity Strobe (ICAO Type A) is used, Low Intensity Lights (ICAO Type B) are not required, only the white strobe at the top of the structure.

Option Three: Dual Strobe 60 meter structure



1. White Strobe for Day Marking (no paint)
2. Red Lights for Night Marking
3. When a Red, Medium Intensity Light (ICAO Type B) is used, Low Intensity Lights (ICAO Type B) must be installed at mid-height.
4. Red Lights are only used at night.

- White Lights in the day eliminate the need for paint
- Red Lights are only for use at night
- The category of light used depends on the structure height
- Low Intensity Lights are always red, Medium Intensity Lights are White or Red, and High Intensity Lights are always White
- Red and White Lights may be installed on the same structure, but are never on at the same time.
- Red Lights may be incandescent, halogen, or LED. White lights are always strobes.
- The ICAO does not have a certification process

Low Intensity Aviation Obstruction Lights



- Always red
- Steady burning
- Incandescent/LED
- Single or double lamp
- 32 cd per lamp



Medium Intensity Aviation Obstruction Lights



- For use on structures above 45 meters
- Red Lights (Incandescent, Halogen, Strobes, LED)
- White Strobes
- Dual Strobes

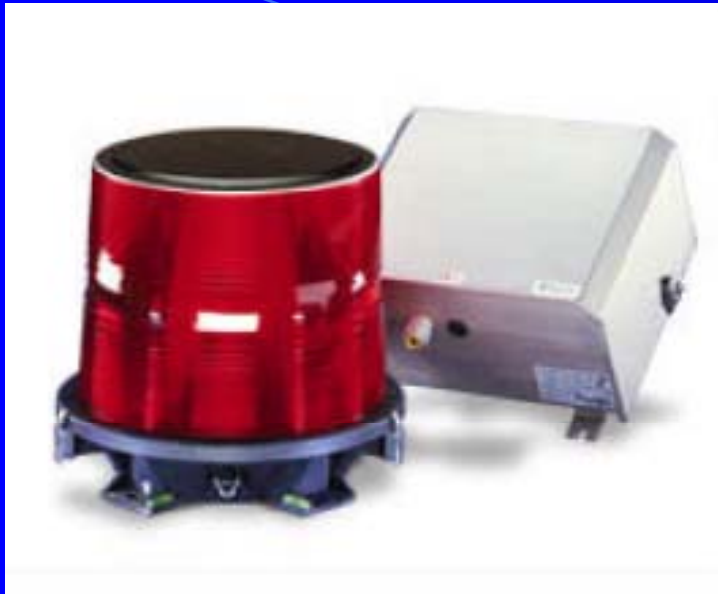
Medium Intensity Red Lights



1. Red lights are only used at night.
2. If only red lights are installed on a structure, paint must be used for day marking.
3. For each level of medium intensity red lights on a structure, an intermediate level of low intensity lights must be installed.
4. The intensity of medium intensity red lights is 2,000 candela \pm 25%.
5. The intensity of low intensity lights is at least 32 candela.



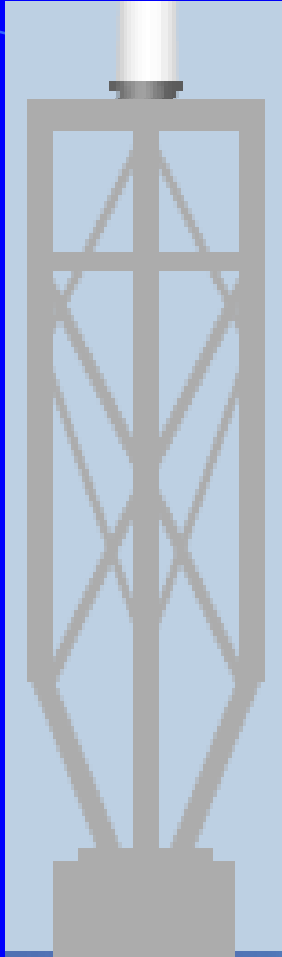
1. Two lamps (620W each) are required to achieve 2,000 cd, for a total consumption of 1240W.
2. Lamps are not redundant; if one lamp fails, the light does not meet photometric or optical specifications.
3. Aerodynamic Wind Loading = 1.6 ft^2
4. Weight = 30.8 Kg



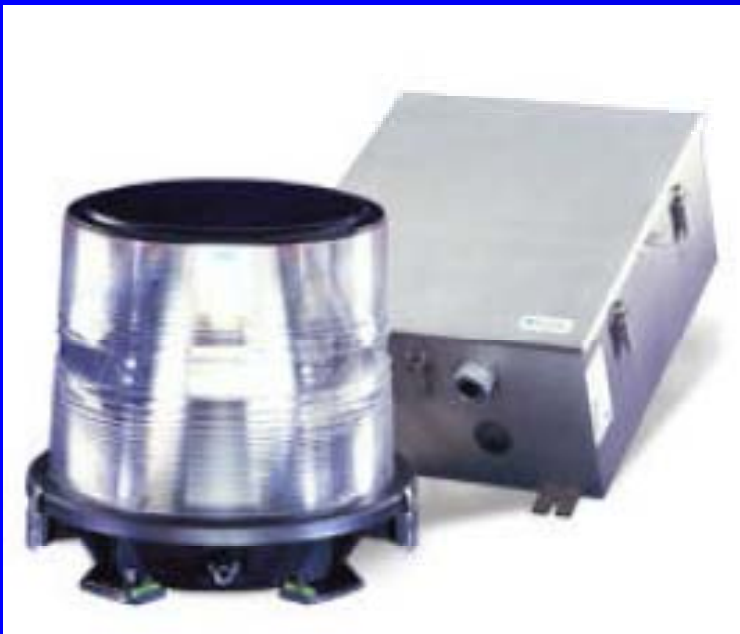
1. **Power Consumption 145W – less than 12% of the energy required by a 300mm incandescent beacon.**
2. **Aerodynamic Wind Loading = .93 ft²**
3. **Flashhead Weight = 7.7 Kg Facilitates installation**



1. Estimated 5 year minimum life on light engine
2. Weight = 20 Kg
3. Shock and vibration resistant
4. Modular design allows for easy replacement of light engine

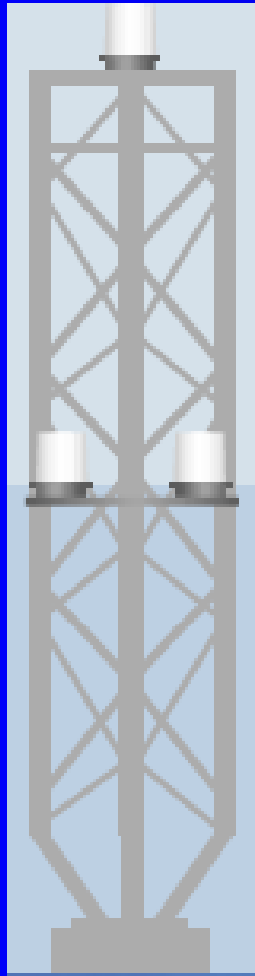


1. White Strobe for Day and Night marking eliminates the need for paint
2. Two intensities: 20,000 cd day
2,000 cd night
1. Only one light required for structures up to 105 meters

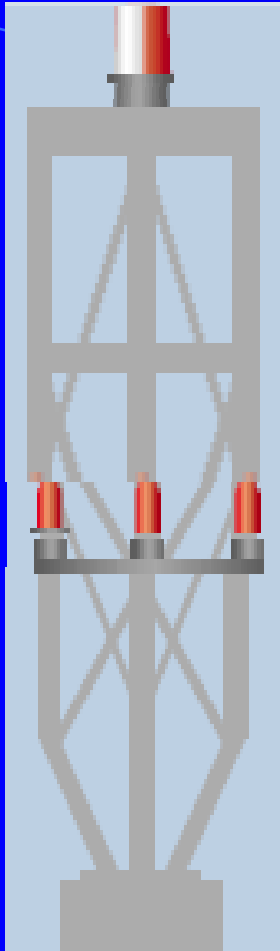


1. Low power consumption – average of 100W
2. 95% of components located at ground level means less climbing and easy maintenance
3. Stainless steel enclosure can be mounted indoors or out

White Strobes: 105 – 150m Structure



- White lights for day marking and night marking
- Only three white strobes are required, no low intensity lights

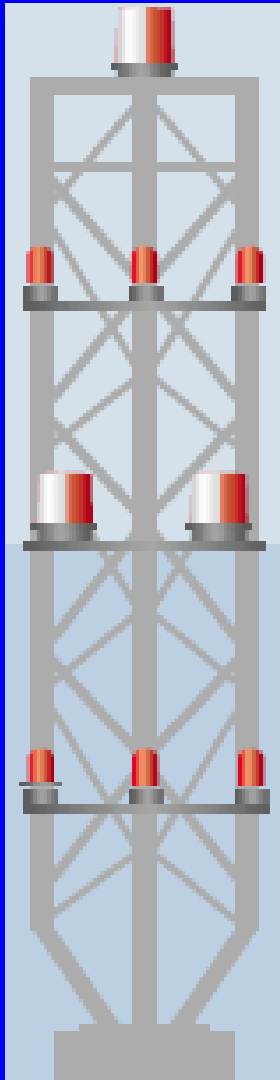


1. White Strobe for Day Marking (no paint)
2. Red Lights for Night Marking, for use in urban areas where a white strobe at night is not desired
3. Failure of Red Light activates “White Night Backup Mode”



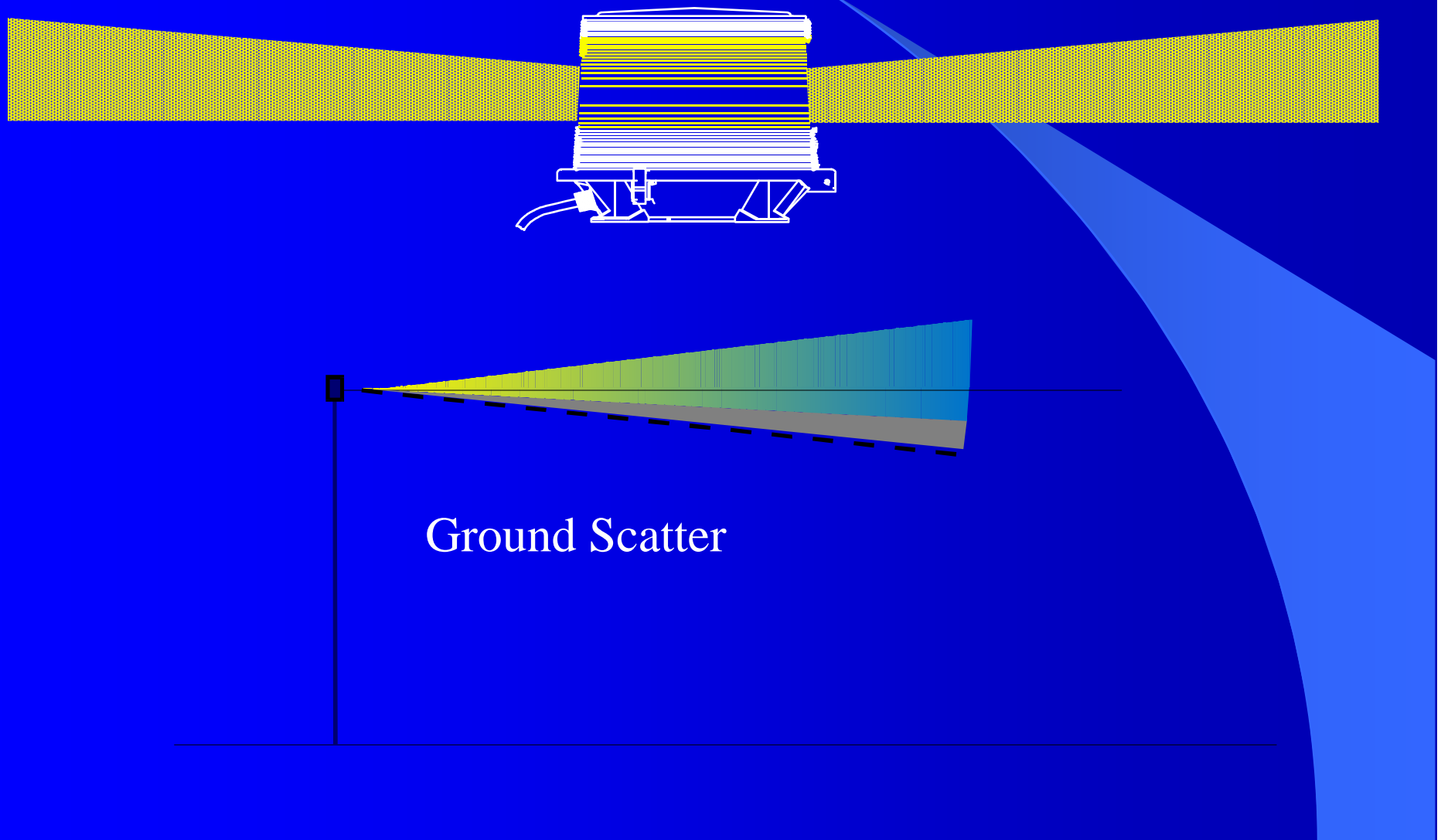
1. Twin helical flashtube design
2. More than 90% of components located at ground level means less climbing and easy maintenance
3. Average 135W power consumption

Dual Strobes: 105 – 150m Structure

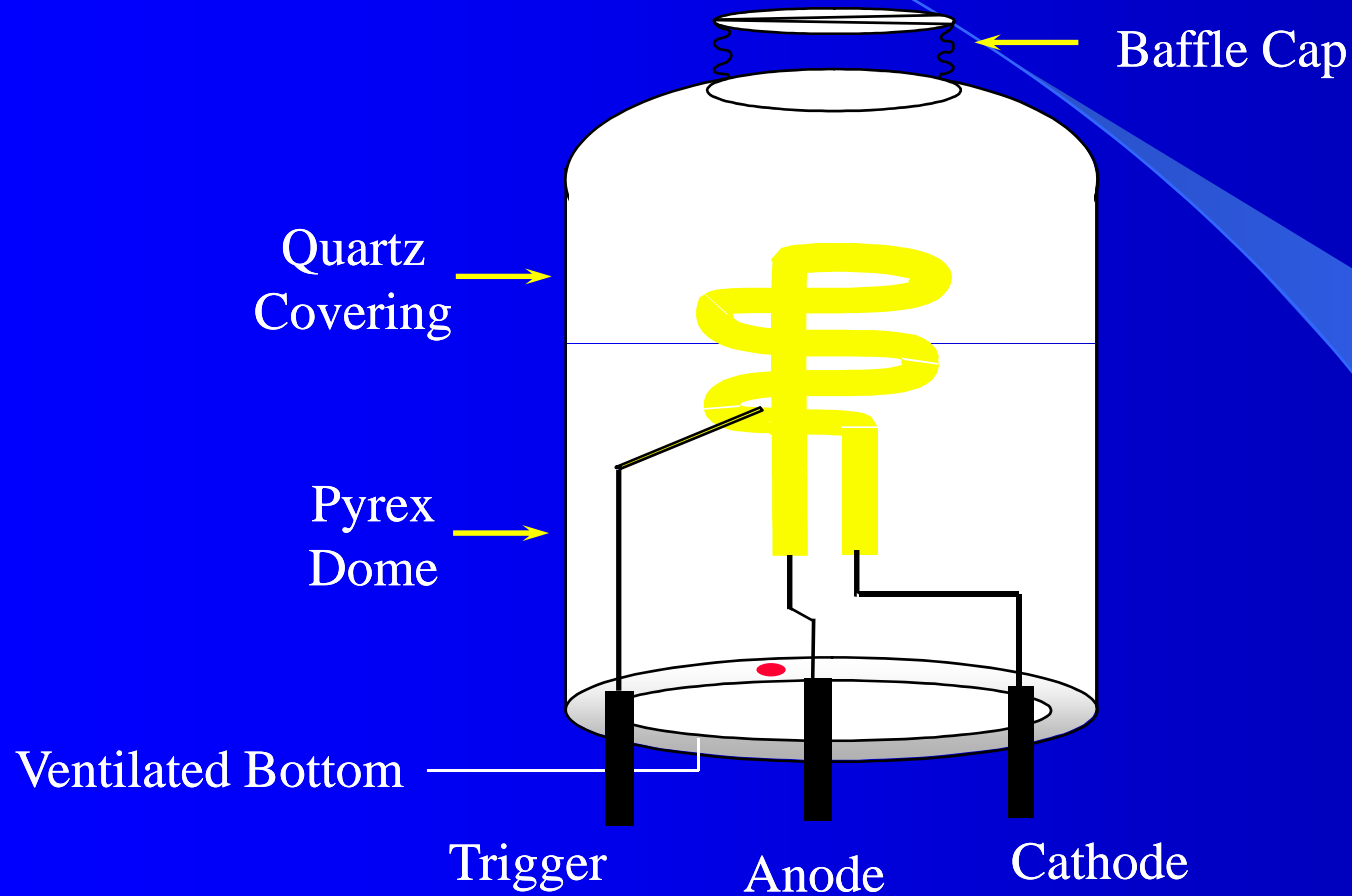


- Three white strobes for day marking; paint is not required
- Red strobes and low intensity lights for night marking
- A total of three dual strobes and two levels of low intensity lights are required.

400mm Fresnel Lens



Helical Xenon Flashtube



Helical Xenon Flashtube

- Xenon Gas is the most stable Noble Gas
- Helical Design creates a compact but bright light source, perfect for use with our patented Fresnel lens
- Fool-proof installation with offset legs
- Large tube diameter allows for efficient heat dissipation
- Quartz covering and baffle cap reduce destructive UV rays
- Pyrex dome allows for easy installation
- Vented bottom allows heat to escape

- 95% of electronic components are located at the ground level. In the event of a failure, in most cases the repair can be done without climbing the structure
- Rated for Outdoor Use
- Wiring schematic is located inside the cover of all power converters
- Multiple-light systems are easy to create

High Intensity Aircraft Warning Lights



- For use on structures above 150 meters
- High Intensity Lights are only White Strobes

Characteristics of High Intensity Strobes

1. **High Intensity Strobes are always white, but red lights may be incorporated at night to form a dual lighting system**
2. **They require an external controller**
3. **High Intensity Lights may have a single enclosure or a separate enclosure**
4. **They have a horizontal beam spread of 120 degrees**
5. **They have three intensity steps for day, twilight, and night**

ICAO Standards for High Intensity Strobes

Type A

- Day Intensity = 200,000 candela $\pm 25\%$

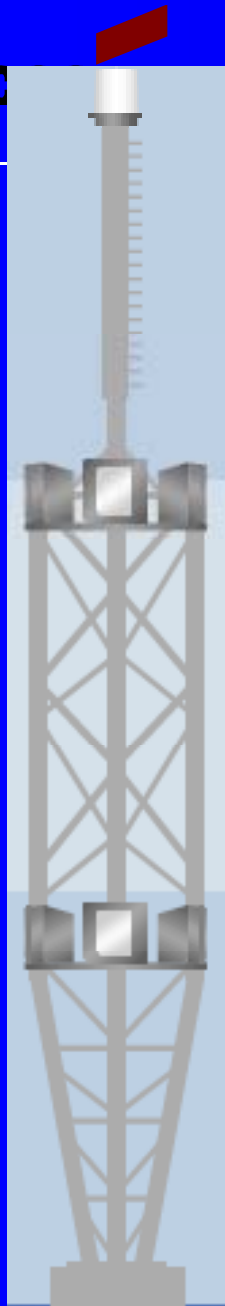
Type B

- Day Intensity = 100,000 candela $\pm 25\%$

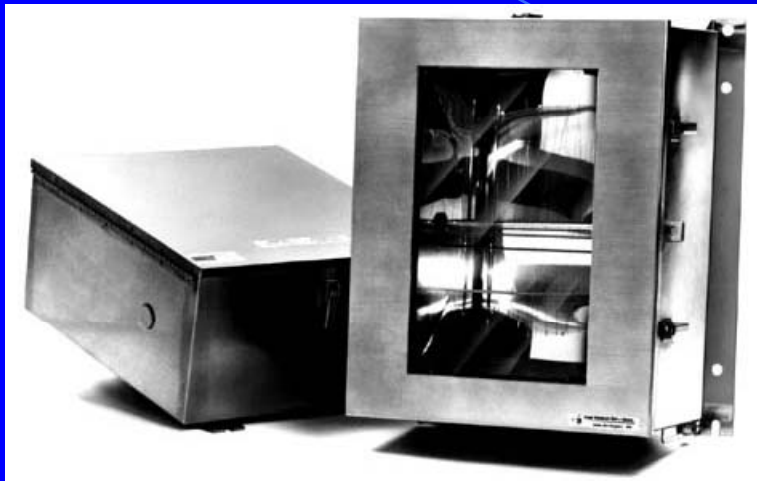
Type A and Type B

- 40 – 60 Flashes per minute
- Vert. Beam Spread = 3 - 7°
- Intensity at -10° = 3% of max
- Horizontal Beam Spread – 120°
- Twilight Intensity = 20,000 candela $\pm 25\%$
- Night Intensity = 2,000 candela $\pm 25\%$
- Intensity at -1° is min 50%, max 75%

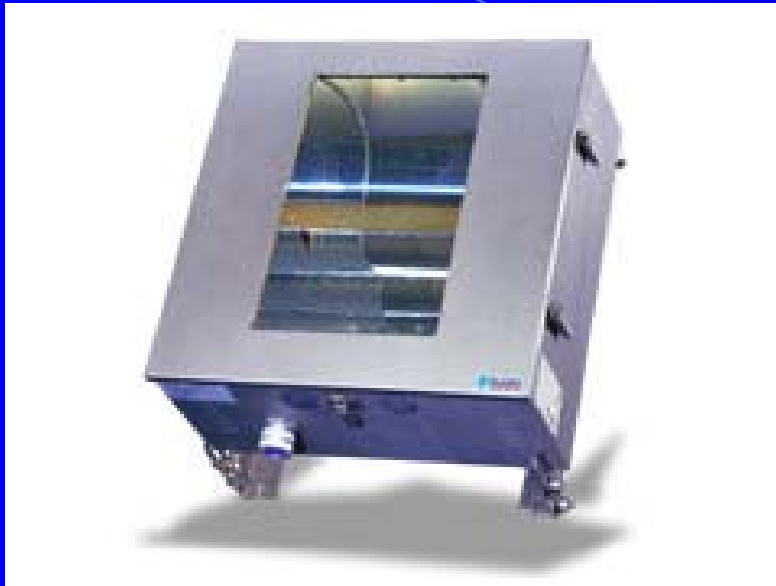
High Intensity Strobes



- Because the horizontal beam spread is 120° , at least three lights are required per level to achieve 360° horizontal coverage
- Appurtenances more than 12m tall require a 360° medium intensity beacon
- All lights must flash simultaneously
- For use on towers more than 150 meters tall



1. Separate enclosure allows 95% of electronic components to remain at lower levels
2. Flashhead Weight = 8.2 Kg
3. May be configured as ICAO Type A or B



1. **Single Enclosure – Power Converter and Flashhead all-in-one**
2. **Aerodynamic Wind Loading = 2.9 ft²**
3. **Weight = 38.6 Kg**
4. **0.4 KVA Average Power Consumption**

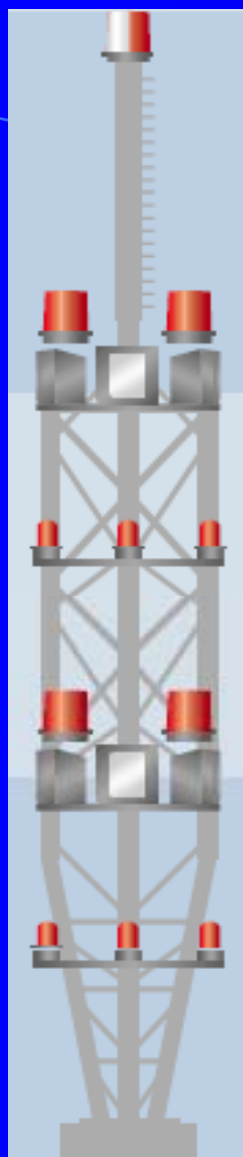


1. **Separate Enclosure** allows for more than 90% of the electronic components to be located at a lower level
2. **White Strobe in Day** allows for no paint
3. **Red Strobe at night**, perfect for urban locations



1. **Single Enclosure Power Converter / White Flashhead also powers red strobe**
2. **White Strobe in Day allows for no paint**
3. **Red Strobe at night, perfect for urban locations**

EXAMPLE



Over 150m but not more than 210m
(Excluding *appurtenance*)
(1) Medium Intensity Type A / B Light
(4) Medium Intensity Type B Light
(6) High Intensity Type A Lights
(6) Low Intensity Type B Lights
(8) if square tower

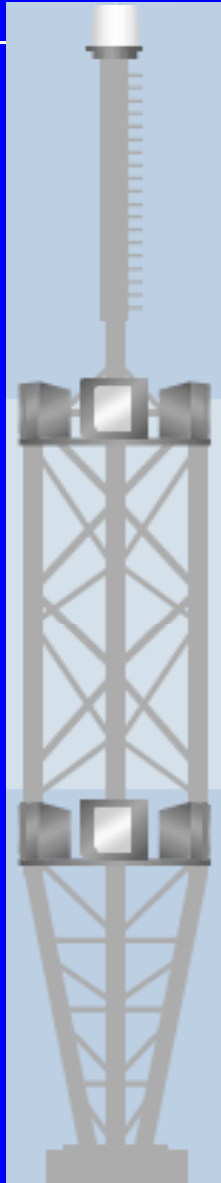
High Intensity Strobes White Systems

EXAMPLE

Over 150m but not more than 210m
(*Excluding appurtenance*)

(1) Type A Medium Intensity Light

(6) Type A High Intensity Lights

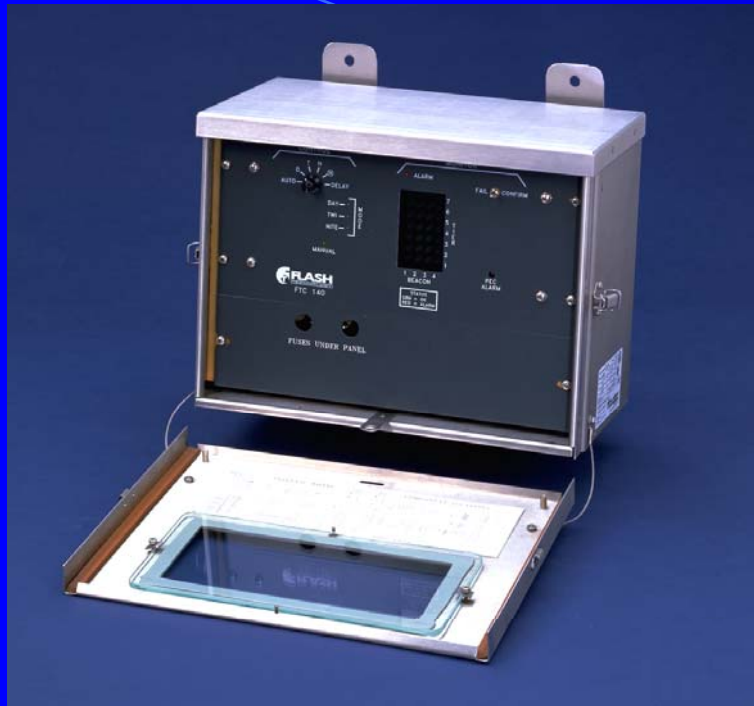


High Intensity Strobes – System Controllers

- High Intensity Strobe systems use an external controller
- High Intensity Flashheads do not have electronic “brains”; they depend on the system controller to carry out their functions

High Intensity Strobes: System Controller FTC 140

- The FTC 140 provides synchronization, individual light monitoring, intensity control, and manual intensity override for High Intensity Strobe systems



High Intensity Strobes: System Controller FTC 121



- The FTC 121 is a menu driven controller with enhanced monitoring and diagnostic capabilities.

- FTW 170 Unit for wireless synchronization
- Applications across multiple towers/buildings can be synchronized w/o expensive hard wiring....regardless of distance

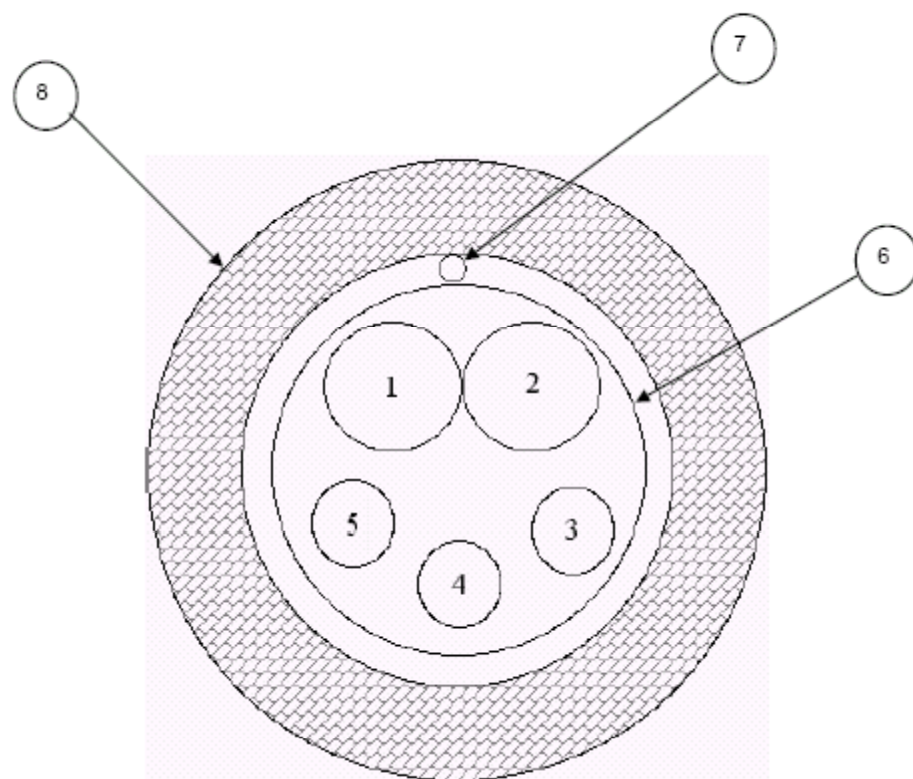
- FAA Certification ensures quality ... the products have been rigorously tested
- Our lights are designed for easy maintenance
- Full product line
- Proven track record
- We can offer supply, design, installation, commissioning and maintenance

THANK YOU!

WE'RE YOUR SOLUTION FOR AIRCRAFT WARNING SYSTEMS

APPENDIX

P/N 6340 CABLE



- ITEMS 1 & 2: #10 AWG STRANDED COPPER, INSULATED FOR 600 VOLTS
- ITEMS 3, 4, & 5: #16 AWG STRANDED COPPER, INSULATED FOR 600 VOLTS
- ITEM 6: ALUMINUM SHIELD APPLIED OVER ALL CONDUCTORS
- ITEM 7: #18 AWG DRAIN IN CONTINUOUS CONTACT WITH ALUMINUM SHIELD
- ITEM 8: BLACK, WEATHER, UV, AND OZONE-RESISTANT PVC JACKET
- CABLE DIAMETER IS 0.60"
 - UL AND CSA APPROVED
 - WEIGHT: 25.19 LBS. / 100 FEET – ADD 3.75 LBS. PER 100' FOR SPOOL
 - CONDUIT NOT REQUIRED
 - AVAILABLE ONLY IN INCREMENTS OF FIFTY (50) FEET (15.24 METERS)

Why Choose Our Products?

- Superior product quality
- Nearly 35 years of experience with pulsed lighting
- Innovative technology
- Leading manufacturer of strobe (pulse) lighting products
- Experienced project teams
- Products meet and exceed FAA and ICAO specifications
- Proven track record worldwide

The Category of Light Depends On the Structure Height

Height	0 – 45m	45 – 150m	> 150m
Category	Low	Medium	High

ICAO and FAA Compared

Low Intensity, Type B (L-810)	ICAO Specification	FAA Specification
Intensity Requirement	32 cd minimum	32.5 cd minimum
Vertical Beam Spread	10 Degrees	10 Degrees

ICAO and FAA Compared

Med Intensity, Type A (L-865)	ICAO Specification	FAA Specification
Day Intensity Requirement	20.000 cd $\pm 25\%$	20.000 cd $\pm 25\%$
Night Intensity Requirement	2.000 cd $\pm 25\%$	2.000 cd $\pm 25\%$
Flashes per Minute	20 – 60	40
Intensity at -1 degrees	50 – 75% of Minimum allowed	At least 50% of Minimum allowed
Intensity at -10 degrees	Max of 3% of Peak Intensity	Max of 3% of Peak Intensity

ICAO and FAA Compared

Med Intensity, Type B (L-864)	ICAO Specification	FAA Specification
Night Intensity Requirement	2.000 cd $\pm 25\%$	2.000 cd $\pm 25\%$
Flashes per Minute	20 – 60	20 - 40
Vertical Beam Spread	3 degree Minimum	3 degree Minimum
Intensity at -1 degrees	50 – 75% of Minimum allowed	At least 50% of Minimum allowed

ICAO and FAA Compared

High Intensity, Type A (L-856)	ICAO Specification	FAA Specification
Day Intensity Requirement	200.000 cd $\pm 25\%$	270.000 cd $\pm 25\%$
Twilight Intensity Requirement	20.000 cd $\pm 25\%$	20.000 cd $\pm 25\%$
Night Intensity Requirement	2.000 cd $\pm 25\%$	2.000 cd $\pm 25\%$
Intensity at -1 degrees	50 – 75% of Minimum allowed	At least 50% of Minimum allowed
Intensity at -10 degrees	Max of 3% of Peak Intensity	Max of 3% of Peak Intensity
Flashes per minute	20 – 40	40